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RELATION OF SCIENTIFIC MANAGEMENT TO LABOR

SUMMARY

I. Introductory. Definition of terms, 311. — Distinguishing features of scientific management, 312. — Scientific management is positive management, 314. — II. The influence on basic wages, 315. — Wages and the labor problem, 317. — III. The bonus method and its results, 319. — Effect of increased production on employment, 322. — Skill and initiative, 325. — Health, 327. — The "first-class," the average, and the sub-normal; legislation on the minimum wage; employment of women and children, 327. — IV. Labor unions; incompatible policies, 330. — Possible bases of co-existence, 339. — V. Larger social problems. Unemployment, 342. — Education and skill, 343. — Inequality of income, 345. — Democracy in industry, 346. — Prospects for the future, 348.

I

INTRODUCTORY

THE discussion of the relation of any new economic factor to existing economic and social tendencies requires clear definition of the factor under examination. The system of management currently known as "scientific management" or "the Taylor system" has been variously referred to as a new form of industrial organization, a new type of administration, a new "system." Again it is said to be a science, an art, a set of laws, principles, rules, methods and processes, a policy, or even a set of forms and mechanisms. Its significance as an economic factor depends upon which of these things it is.

Let us clarify our terms. Industrial organization is the definition, correlation and coördination of parts and functions in a group of elements made up of land and buildings, capital and credit, equipment and men,

adapted to attain the ends of economical manufacture, sale at a profit, and growth at least to the point where the effect of diminishing returns counterbalances the possible advantages of further expansion. System is the mechanism whereby organization performs its functions of administration. Administration is the dynamics of organization. It is the injection of initiative, stimulus, and control into the static system of which organization is a cross-section. Rules, methods, and processes are names of varying degrees of inclusiveness for the prescribed procedures in the accomplishment of usually circumscribed and isolated results. A policy is a generalized rule determined by a process of trial and error rather than by a scientific method of investigation, and justified empirically by its results.

Under these definitions it is apparent that scientific management is a type of industrial organization and administration with a system of its own and involving the use of rules, methods and processes and to some extent, of policies, just the same as any other type of management. What is to differentiate it from others ?

Scientific management in its best manifestations may be distinguished from other types of management in that it proceeds on industrial principles which may be defined as generalized rules of conduct based on *law*, recognized or as yet undiscovered, and useful for the attainment of important industrial ends such as maximum output, low cost, high wages, equitable distribution, reduction of unemployment, industrial peace. If we define a law as a summary statement of fact or a description of a tendency common to a class of things, then an industrial law is any law, physical, chemical, biological, psychological, economic, or social, which is or may be a factor in industrial management. The test by which scientific management makes any law an indus-

trial law is the effect of that law on economy of production or conservation of energy, human or material.

What makes a type of management scientific, then, is the fact that it rests on laws and principles rather than on policies. To be sure, until all the laws and principles of management are ascertained, it still remains true that policy must play a large part and that to that extent management remains at least partially an art; but the intention and the conscious effort to reduce the field of policy and enlarge that of principle and law justly entitle any system which holds to it consistently to the name scientific management.

That the Taylor system is such a system has been shown in former articles.¹ It rests on both laws and principles. Its laws are the physical and chemical laws covering materials, equipment, and processes; and the psychophysical laws, undoubtedly operative no matter how dimly understood, which govern the individual conduct and reactions of the human beings involved. Its principles are those which govern the relations of individuals to each other in organized groups and the methods of procedure by which scientific management is made effective in practice. It is important to bear in mind the distinction between the science on the one hand and the principles on the other. Natural laws are fixed and inflexible. They cannot be altered by a majority of votes. Principles, however, if defined as rules of conduct, may be changed and in fact are constantly subject to modification.

The most distinctive contribution of scientific management has been in the field of principles rather than in that of laws. The determination of laws is a long and usually unlucrative process, better carried on by "pure

¹ See my articles, "The Literature of Scientific Management," in this Journal, August, 1914; "Scientific Management in Practice," *ibid.*, February, 1915.

scientists " in their laboratories for the benefit of all possible users than by individual managers distracted by a multitude of practical problems and interested only in their personal advantage. Mr. Taylor's work on *The Art of Cutting Metals*, which at times converted whole sections of shops into laboratories, is the conspicuous exception which proves the rule. On the other hand the successful administration of a new type of organization absolutely requires the determination of the principles on which it will be conducted. Starting therefore with the principle of basing all productive activity on law, Mr. Taylor was compelled to work out the principles which have now become known distinctively as those of scientific management. The science of industrial conservation is a free field open to every one capable of cultivating it, but the principles of industrial organization as developed by Mr. Taylor are thus far the distinguishing possession of those trained by him or his immediate disciples.

This analysis makes clear the fact that scientific management is the extension to industrial organization of the positivist movements in current thought. The substitution of a basis of scientific law and principles for guess work or tradition reminds one strongly of Comte's theory of progress from the "theological" through the "metaphysical" to the "positive" or scientific stage of thought. It is interesting to observe that scientific management is positive management in other senses as well, which flow from its essentially scientific aim and method. Its administration is marked by the positiveness of its control. So far as possible, nothing is left to accident or to individual judgment. The time, place and sequence of all operations as well as the details of all processes are determined and enforced by the management. The result of the application of the science

of industrial conservation and the principles of industrial organization is to develop the inherent resources and capabilities of an organization far beyond the average or normal degree of efficiency. This distinguishes scientific management from the current types of "efficiency systems" which are usually based on varieties of cost keeping built on the methods of accountants rather than of statisticians, superficial observations and incoördinated improvements. Their aim is to "stop leaks," "eliminate wastes," "avoid delays." In other words, to remove a mathematical negative and bring an organization to a normal standard. The aim of scientific or positive management is to carry an organization beyond this normal standard and bring it to the utmost degree of efficiency of which it is capable. In other words to accomplish a mathematically positive result.

The most interesting questions connected with the effect of scientific management on the labor problem are first, its influence on basic wages: second, the probable consequences and effect of the method of differential payment by means of the bonus; and third, the relation of scientific management to fundamental labor union policies and practices. These will be taken up in order.

II

THE INFLUENCE ON BASIC WAGES

Scientific management tends to shift the demand from labor which is already skilled to that which is teachable. It draws its labor supply not so much from those equipped with the usual store of traditional knowledge and technique as from those with the aptitude which enables them to respond quickly and effectively to the intensive training in the newer methods.

The effect of this tendency would be eventually to abolish the line between "craft" groups. Factory labor may today be arranged in a hierarchy of day laborers, "lumpers," automatic machine tenders, helpers, skilled machinists and artisans, foremen and clerks. Scientific management as actually practised trains each of these grades in a variety of functions usually performed by other grades. Thus laborers may easily become truckmen. Truckmen may at a pinch attend the simpler automatic machines. Machine tenders are easily made into helpers, and helpers into skilled artisans. The class of foremen and of clerks is almost invariably recruited in scientific management plants from the better men in the lower grades of labor.

The characteristic functionalization in the executive positions opens these positions to types and grades of ability to which they have heretofore been closed. Specialization puts these positions within the range of men who are competent in executive functions such as "getting work through," inspection, or breaking in new operatives, and has made obsolete the type of all-round ability (much written about but rarely found) which was erroneously supposed to be a requisite of the old methods. More lines of promotion are thus opened and the demarcation between the workmen and executive groups tends still further to be obliterated.

In short, the effect of these features of scientific management is to break down the traditional lines between craft groups while at the same time they develop individual differences and individual abilities to the utmost and thus establish a new grouping on the basis of inherent and acquired capacity.

Some economists would say that the abolition of craft groups would not only tend to level wages by increasing the homogeneity of labor, but to lower them on the

whole by extending the marginal zone which they say is the controlling factor until it includes a lower grade of efficiency and productivity. Such perhaps would be its effect in practice were the tendency not offset by certain countertendencies.

The first of these is the greater productivity of labor in the new grouping due to the positive methods of scientific management. This makes all grades of labor more desirable for the entrepreneur. Or if you prefer to put it that way, it raises the value of the marginal workmen.

The tendency to increase the number of entrepreneurs is an aid in the maintenance of higher wages by intensifying the competition between them for labor.

The thoroughgoing development of differential abilities in individuals within groups clearly brings out inherent differences in effectiveness and value which are more or less obscured by current methods of measuring the worth of workmen. Considered as "capital" on the analogy of instruments (made by man) and land, the "rents" for their differential abilities are more clearly brought out, and the capitalized value of each workman is more easily ascertained. As the more keenly competitive utilization of land has on the whole tended to raise the total amount paid to owners as rent, so it would seem fair to assume that the keener competition for workmen and the clearer differentiation in their worth should tend to increase the total amount paid to them as wages.

The same differences in inherent capacity which tend on the whole to raise the total of wages also tend to maintain the higher wages paid to the more able individuals, inasmuch as the differences which under scientific management conditions are important are natural, inherent and practically ineradicable.

If these propositions are true we can proceed to the familiar chain of reasoning to the effect that increased wages tend to raise the standard of living and with it to decrease the size of families. This in its turn decreases the supply of labor, which, assuming that its product remains the same or even increases, raises its value. In this way also exceptional opportunities are afforded to children for still further development of inborn abilities and accentuation of differences. The net effect of all these is the maintenance and progressive raising of wages and the standard of living, with their mutual and cumulative reactions.

Today it is probably true that the relative disagreeableness of different kinds of work has little if anything to do with the rates of wages. Those rates seem to be determined by a number of forces, among which customary standards, such differences of ability as may become apparent under current methods, and the relative bargaining powers of employees and employers are the controlling factors. The abolition of artificial "non-competing groups" and re-alignment on the basis of lines of individual ability tend to accentuate differences of wages due to relative efficiency and would thus seem to give more scope to the influence of relative sacrifice, effort or disagreeableness. Too much importance must not be ascribed to this possible effect. It is mentioned here because it is in general agreement with what, as will be shown later, appears to be the more or less unconscious wage theory of those most active in the origination and early development of scientific management.

III

THE BONUS METHOD AND ITS RESULTS

Most of the current discussions regarding the relation of scientific management to wages center about the payment of a bonus or premium. It is customary in scientific management to offer a premium of some sort in addition to ordinary wages for the performance of the extraordinary day's work prescribed in the task or schedule made possible by standardized conditions. This is justified on the ground that it is "fair" to pay an unusual wage for an unusual day's work: that it is necessary in order to get the workman to accept and utilize standard conditions; that it is possible because of the superior profits of the entrepreneur using scientific management; and that it is a just recognition of superior qualities. In other words, it is justified by its advocates, no matter by what ethical theory of wages it may be tested.

There are those who question the justice of the basis on which the bonus is determined. That basis is roughly the lowest point at which the workmen will consent to accept and utilize the standardized conditions provided for them and thereby accomplish the task set. Experience has shown that for the majority of men and in average conditions this requires a bonus ranging from 30 per cent to about 60 per cent on the ordinary day's wages. They will not attempt to do the task for less than this nor is it necessary to offer them more.

But is this a fair compensation for an increase of output amounting as in some conspicuous instances to two or three hundred per cent? Ought not this increase to be shared equally with the workmen, or even, as some have put it, to be turned over entirely to them? What should be done in the cases, almost as numerous

(except in machine shops), where the increase in output secured is less than the bonus paid and the bonus is adhered to merely in the interest of consistency or because it aids some other feature of administration, has not been suggested. At least I have seen no proposal that the workmen be asked to accept a lower bonus on that account; nor in fact is there any likelihood that such a proposal would be accepted.

That the increased output due to the application of scientific management cannot be credited exclusively to the efforts of the workmen should go without saying; and the theory that the workman is entitled to all the increase regardless of the expenditures of the management necessary to make this increase possible does not call for serious refutation. The basis for the division at any amount less than the entire increase must be either that of necessity, which may be ascertained by test, or that of some hypothetical "fairness" about which there is no substantial agreement. The test of necessity therefore has the advantage of being practicable and easy to apply.

Without going into a discussion of the bases of social ethics, I merely state my belief that justice and fairness are essentially terms for social expediency. In order to secure the exercise of high managerial ability and initiative it seems necessary, as human nature is now constituted, to insure some certain and exceptional reward to the entrepreneur. Unless the manager gets what he considers a sufficient share of the increased productivity due to positive management he will not undertake the expense and risk of developing the system. It is necessary, and therefore expedient and just, that his share of the profits be at least sufficiently large to make it worth while, in his own opinion, to undertake this measure of progress.

Another question, often urged with critical intent, is whether, when the present extraordinary day's work becomes common and ordinary, the payment of the bonus will continue to be necessary. In other words, when all plants have scientific management, will not unscrupulous managers be in a position to cut wages to their present levels and to use their knowledge of a proper day's output as a more subtle, refined and effective method of driving ?

As long as some plants have scientific management and others have not, those which have it can maintain their advantage only with the willing coöperation of the workmen. Scientific management does not work except with the heartiest consent and help of the men under it. To maintain this attitude it will continue to be necessary to pay the unusual day's wage for the unusual day's work. With the establishment of an ever higher standard of living, the practical necessity of maintaining the differential reward for differential abilities becomes increasingly stronger.

It is conceivable tho hardly probable that all plants will some day have positive management. The process of development is slow, due to a number of causes which will be explained later. Further, it is contrary to all historic evidence to suppose that any tendency may be permitted to work itself out to its own ultimate conclusion unrestrained and unmodified. Every movement involves in itself certain counter-tendencies whose force sooner or later becomes so great as to overwhelm the original tendency. This is the meaning of the "law of diminishing returns," taken in its broadest sense.

If these considerations are not sufficient to obviate apprehension, attention may be called to the fact that if all plants should have positive management the worker's protection would continue to reside in two

forces: first, the dependence of the manager on the worker's good will; and second, the individual and organized opposition of the worker to any substantial reduction in his standard of living. Only those familiar with scientific management in operation can appreciate how vitally necessary to its successful conduct is the spirit of willing, cheerful, and contented coöperation. The mechanism of positive management is delicately balanced and may be completely upset by the intrusion of a feeling of unfair treatment. If this protection should prove insufficient, the workman will still have the force of established custom behind him, and in addition the power which his membership in a union, in unionized trades, will continue to give him — that is, provided some basis may be reached on which scientific management and labor unions in their present form may survive together. If there is no such basis (a topic which will be discussed presently) the chances are that labor unionism, at least as it is now organized and conducted, will disappear; but there will still remain the possibility and perhaps the need for some more truly representative and progressive type of labor organization.

Another question often put by inquiring critics is whether the increase of output made possible by positive management does not or would not go on faster than the market can assimilate, thus leading to the wholesale discharge of superfluous employees. By way of analogy reference is made to the sufferings of the chain workers, weavers, and others, and the general distress which accompanied the substitution of power driven machinery for hand operated tools. No very close analysis of this historic episode is usually attempted in an effort to determine just what part the introduction of power machinery did actually play in

the economic disturbances of the first half of the nineteenth century and what share should properly be attributed to the Napoleonic Wars and other political conditions. It is said however that after all due allowance is made for other factors, one effect of the sudden introduction of labor-saving machinery was to throw large numbers of workmen out of their positions and to increase materially the total of suffering. Is there anything about positive management to make one hopeful of more satisfactory consequences ?

The development of positive management is not parallel to the introduction of power driven machinery. Machinery is something which can be bought in large quantities, installed and operated on short notice. All it requires is a large market for its product, an investment of capital, and a brief training in its operation. Positive management is a type of organization and a set of principles which must be slowly developed, can be used only by those mentally prepared for it, and during the period of transition and adjustment can be had only from a few individuals whose time and energy are limited. It involves on the part of the management a mental revolution and on the part of the workmen a gradual habituation to new methods.

The number of men capable of developing the system is limited, and on account of the peculiar abilities and opportunities required for the successful prosecution of scientific management as a profession the number of its practitioners has not increased very rapidly nor is it likely to in the near future. Only one per cent of the plants in the United States large enough to warrant its development have undertaken it and in no instance has their increased product been placed on the market before the market was prepared to take it up without disturbance.

Instead of throwing men out of work it has thus far meant the more steady employment of forces in plants where it is used. There has been some redistribution of positions. There has been no reduction on account of positive management in the number of those employed; on the contrary, there have been actual increases recorded. It is safe to say that the displacement of workers which may later be possible with the more rapid spread of positive management will not be comparable in extent and influence with that already experienced in consequence of the access of women to men's occupations which has been characteristic of the last half century.

In order to reduce to a minimum the unavoidable redistribution due to the new methods, it is a policy of positive management, thus far consistently adhered to, to insist on the development of sales in advance of the increase in production. This may be accomplished by any one of several methods whose net result is to maintain even employment by spreading production of seasonal commodities over the entire year and to take up the increase in the productivity of men and machines by putting an article of superior quality or lower price before a larger market. Altho the practitioners of positive management have not themselves as yet given much attention to the problems of marketing and distribution, some of them have pointed out the necessity of developing this field and by their insistence have secured practical results in the way of better methods and larger sales.

It is no reproach to the present group of practitioners in scientific management that they have not attacked and solved the problem of distribution. They have had all they could handle in the problem of production. But it will soon become a reproach to society if the prin-

ciples which have been so fruitful in production are not studied, mastered, re-shaped and applied to the problem of distribution.

A criticism frequently aimed at positive management is that its methods tend to destroy the skill and initiative which are alleged to be the capital of the working-man, thus making it more difficult, if not impossible, for him to maintain his position or advance out of his class. The most superficial observation of plants in which the methods of positive management have been fully developed must convince any fair-minded investigator that the criticism is not sustained by the facts. On the contrary, in such plants the skill of the workmen is on the average far above that of their fellows in other establishments; and so far as their capacities enable them to participate either in technical advances or in the exercise of managerial functions, their opportunities are better and more freely utilized in scientific management plants than elsewhere.

In the nature of scientific management it could not well be otherwise. Increased production is secured by superior skill, that is, by better acquaintance with the materials, tools and methods involved and greater dexterity in their manipulation. This is due to two fundamental principles: specialization, making possible a high degree of attainment in a more varied field; and intensive individual teaching of scientifically ascertained methods, developing the capacity of the workmen to its utmost limit. Unfortunately skill is still sometimes confused with variety of attainment. There is a notion that the "all-round" machinist is a skilled machinist. The ability to do a good many things in a trade half well is apt to be considered better evidence of skill than the ability to do a few things perfectly. The contrary is the fact. The methods of training characteristic of the

positive type of management provide the workman with a measurable and demonstrable skill, one of the effects of which is to tone up his standard and make him dissatisfied with a hazy versatility which is unaccompanied with real skill in any detail. With such a standard the workman with inventive ability is enabled in the first place to reach the stage of attainment at which alone invention is worth while, and in the second place to distinguish with accuracy of judgment what invention is useful and practicable rather than merely novel and ingenious.

Initiative, both in invention and enterprise, is found in widely varying degrees. In invention, initiative of the lower grade is if anything all too common. In the vast majority of instances invention proceeds by very short steps from the known to the guessed or desired, and is within the capability of anyone who will take the trouble to familiarize himself with the immediate problem in hand. This is being encouraged and practised every day in scientific management plants. It is desirable when it leads to improvement, otherwise it is a mere hindrance; and it is about as apt to be one as the other. The higher type of invention which comes out of the blue, as it were, is extremely rare and is epoch-making in its manifestations. It is the mark of genius and is not affected by any such factor as a type of management.

Initiative in the sense of enterprise is comparatively rare. Its possession in even a moderate degree distinguishes the entrepreneur from the workman; its presence in highly developed form marks off the daring merchant or captain of industry or of finance from the hum-drum manager of a routine business. The tendency of positive management is to provide unusual opportunities for the exercise of both types of initiative and therefore to encourage its manifestation.

Those whose professional interests cause them to be opponents of scientific management, and some of their philanthropic and academic sympathizers, are fond of alleging that it is a speeding-up device injurious to the health of the workmen. Extensive and frequently repeated investigations have thus far failed to reveal anything to substantiate this criticism. On the contrary, the beneficial results which might be expected to follow from increased wages, steady work, improved working conditions, conscious attention to the fatigue factor, individual training and the necessity of fit physical and mental condition, all of which are essential to the accomplishment of the task as set by scientific management, have been found in fact to follow. The whole aim of positive management is to substitute intelligent economy of effort for unintelligent driving, and such has been its practice. When its critics, confronted with the facts, resort (as has one, at least, to my knowledge) to something in the nature of an intuitive belief that in spite of appearances positive management in some way injures "global efficiency," whatever that may be, it is evidence of the survival of a metaphysical stage of thought into an atmosphere of scientific determination.

The emphasis laid by Mr. Taylor on the value of the "first-class man" has misled many people into the impression that the Taylor system can find no place for any but the exceptionally capable worker. This is due partly to a failure to grasp the meaning of Mr. Taylor's phrase "a first-class man." In positive management a first-class man is one who is adapted to the job he is doing, whether it be digging a ditch, tending an automatic machine, acting as inspector, running a plant or organizing a combination. By applying intelligence and discrimination to the selection of men to fit the individual case and the attention necessary to train them

to the most effective handling of their jobs, positive management aims to make every man a first-class man. It must be said that in practice this has often been the result actually achieved. Obviously this is a very different thing from the selection of the exceptional man and the rejection of the average. It amounts to the development in the average man of an exceptional fitness for his job.

This process has an important bearing on the questions revolving around the employment of the subnormal and the application of minimum wage legislation. At present the weak point in minimum wage legislation is the fact that an employer cannot be expected or compelled to employ people who are not able to earn the minimum wage prescribed. Where that wage is fairly high, such for instance as has recently been established in the brush making industry in Massachusetts, it tends to the elimination of all except those who by superior capacity and knowledge have raised themselves up to and beyond the point at which they earn that wage. The employer has the alternative either of dropping all not yet up to that point or of training them so that they are worth the minimum set. Positive management has shown the possibility, the advantage and the method of such training. It points clearly and demonstrably to the solution of the problem how to meet the interests of the employees, the employers and the general public at one and the same time through minimum wage legislation, namely, by the development of the efficiency of plant, equipment and employees up to and beyond the point where the minimum wage is recognized as a reasonable and possible standard.

The superiority of the results attained by positive management on account of its closer, more centralized, better harmonized, defined and trained organization as

compared with the looseness of household and domestic industry points to a new means of combating the sweating evil. The sweated industries are the happy hunting grounds of the traditional driver. Positive management has demonstrated that applied science and the system of industrial principles based upon it produce results greater than those which follow from driving methods. These results, it need hardly be said, can be secured only under centralized factory conditions.

The methods of positive management also have a bearing on the employment of women and children. Whether the remarkable increase in the employment of women in recent years is a necessary evil or a blessing in disguise is not altogether clear. That it has resulted in grave social loss both through the physical injury to women and to motherhood and also through the cutting of wages in competition with men cannot be denied. The tendency of positive management is to ameliorate to some extent both these harmful consequences. In its regard for the physical fitness and welfare of its employees, it is less likely to develop or tolerate practices whose effect may be personally and physically injurious. In its accurate determination of individual ability and its payment of wages in proportion to the ability thus determined, it reduces the possibility of unfair competition between the sexes. Whether a woman is doing as much work as a man is a question which may be answered objectively and scientifically instead of metaphysically as is the present tendency. Whether women are entitled to equal pay then becomes a question of fact.

Similar considerations apply in even greater force to the work of children. The evil consequences of that work are greater and more indisputable even than in the case of women. On the other hand its inefficiency rela-

tively to men's work is much more obvious. Positive management has already shown in many cases that it does not pay to employ children. It is thus in a position to reënforce, from the "practical" business point of view, the advocates of child labor legislation, whose arguments are usually based on more general social considerations.

IV

LABOR UNIONS

Until recently the problem of the relation of scientific management to organized labor had, as one of its practitioners said, "merely an academic interest." There was no attempt to develop the system in closed shops. In other shops no one inquired or knew whether there were union men or not; nor, if there were such, did they offer any objection to the development of scientific management. About 1910 however, or even earlier, in some of the railroad brotherhoods, the attention of professional labor leaders was directed toward the possibilities of this type of management. Their reaction was unfavorable; but except for the refusal of locomotive engineers to accept the bonus proposals on the Santa Fe railroad, no opportunity to express their organized opposition to scientific management presented itself until that system was extended to a detail of the Watertown Arsenal, which is part of a highly unionized branch of the government service. This was seized upon by the leaders, apparently without regard to the real feelings of the men or the facts in the case, as the occasion for a brief and insignificant strike and a long train of government investigations, reports, petitions, and bills in congress, whose aim is to discredit positive management generally by setting on it the stamp of governmental disapproval. In the last congress this agitation was

partially successful, altho the labor leaders seem to have gotten through the wrong bill. The affair has at least been of sufficient importance to convert the question from one of academic interest to one of general industrial and economic consequence.¹

The traditional attitude of the practitioners of positive management is based on strong practical considerations of which they are fully cognizant, and on an economic theory which is rather implicit in their discussions. In general they admit certain historic advantages in trade unionism, such as the gradual shortening of hours, the improvement of working conditions, and the maintenance and raising of wages. They admit that labor organization is still necessary to secure and maintain these advantages in plants not using positive management. But they insist that positive management provides these advantages to the working man more quickly, more certainly, and in fuller measure, than labor organization ever has done or can do. Reduction of hours is a not uncommon practice under positive management. The standardization of conditions to the point of economic perfection is a fundamental principle. Wherever positive management prevails, basic wages are maintained as a matter of expediency, and are raised by the extent of the bonus. These results are brought about quickly, and without dispute or trouble. Why then, they ask, is labor organization necessary ?

The advocates of positive management do not stop, however, with this negative position. They maintain that certain of the present principles and practices of labor unionism are not only incompatible with the fundamental principles and practices of scientific manage-

¹ As is recognized by the fact that the United States Chamber of Commerce has appointed a committee, in response to this agitation, to investigate the subject once more.

ment, but are subversive of the public interest. This criticism applies to such practices as restriction of output, insistence on a uniform wage, collective bargaining on matters which are questions of fact rather than of opinion, restriction of membership, and the closed shop.

Socially controlled restriction of output may under some circumstances be advisable, as when there is regulation of the acreage to be sown in wheat or cotton or of the amount of coal to be mined year by year. The movement for the conservation of natural resources is a form of restriction enforced in the broad public interest. This is an essentially different matter from privately controlled restriction, whether by the entrepreneur or the workman. Such restriction may be of temporary advantage, maintaining profits for awhile for the entrepreneur and possibly maintaining wages and postponing unemployment for awhile for the workman. Both these results, however, are temporary and of individual benefit. Scientific management aims fundamentally at the increase of the national dividend, which any form of privately controlled restriction aims to reduce. Scientific management, while recognizing that over-production may occur as an accidental result of uncoordinated industrial activity or of the friction and groping of distribution, denies the possibility of real over-production in the sense of an excess of consumable goods over the needs of society. Positive management opposes the lump of labor theory, and insists that the more economically work can be done the greater will be the demand for it and the more highly rewarded the workers. And there is no question that increased production at lower cost per unit is desirable, at each successive stage, from the point of view of the entrepreneur producer.

Altho labor unions are becoming less and less willing to acknowledge restriction of output as a fundamental

policy, there can be no doubt that such restriction is their constant practice and that in the back of their heads it is their final answer to the problem of unemployment. For the individual workman in the individual plant much is to be said for their theory. If the plant has orders for a hundred units, the men's jobs will last ten times as long if they take ten days instead of one day each per unit. The broader social consequences of this type of restriction work out slowly and react only in the most obscure ways on those who practise it, while its immediate personal consequences are obvious and apparently advantageous. Even if the workman sees the ultimate social disadvantage of this policy, he can hardly be expected to sacrifice his present personal advantage to a remote social good.

Inasmuch however as one of the fundamental aims of positive management, and a necessary result of all its practices and methods, is the increase of output, there is here, in the absence of centralized social control of production, an irreconcilable conflict. It would appear that the ultimate social as well as the immediate industrial advantage is on the side of positive management and that, as it cannot surrender its fundamental principles, it must continue to educate society to the advantages of large output and to fight all efforts to restrict it.

There is an equally fundamental conflict between the trade union principle of a uniform wage based on class similarity and the positive management principle of a differential wage for differential abilities.

Positive management accepts the wage current in the community as its basic wage, and so long as general conditions remain substantially the same, considers that this wage should be paid uniformly to all workmen for an ordinary day's work. Some of its practitioners may question theoretically the justice of these current rates.

While their theories have apparently not been thoroughly reasoned out nor stated with any great clearness, there appears to be among them a feeling that basic wages should be related to each other in proportion to the disagreeableness, sacrifice, or "cost" of different occupations, scientifically determined. One proposes that this determination shall be on the basis of foot pounds of energy expended, another on an estimate of the relative total disagreeableness or irksomeness of jobs. These theories are not pressed very insistently, however, nor is there much tendency to question the justice of the current rates. On the whole they are felt to depend upon some rather hazy "law of supply and demand"; and in any case the validity of this law, if there is any, is outside the practical scope of a scientific manager's business. He accepts current wages as they are, as the basis on which to build a differential payment for differences in ability.

For on the theory express or implied that wages should be proportionate to productive efficiency, it is agreed among all scientific management experts that it is both just and necessary to pay more than an ordinary day's wage for an extraordinary day's accomplishment such as is made feasible by their methods. It is necessary, as already explained, because otherwise the workmen will not perform the unusual day's work. It is just, because it tends to encourage the exercise of superior abilities to the ultimate benefit of society; whereas a uniform wage tends to reduce the effort of all men, whatever their capacity may be, to the level of the least efficient man who receives the uniform wage. There is also a feeling, scarcely reasoned out or defined, that the workman should in some way share in the increased product secured at least in part through his efforts. In any case there is a thoro conviction that differential

wages are essential to the practice of positive management and that therefore the trade union principle and practice of uniformity is absolutely unacceptable.

The objection of positive management to collective bargaining rests theoretically on the incompatibility between bargaining and the accurate scientific determination of facts, and practically on the numerous difficulties thrown in the way of the reorganization of a plant by recognition of labor unions as at present led and conducted. Positive management endeavors to build up the principles of industrial organization as well as the science of industrial conservation upon a basis of ascertained fact, where possible; and it declines to admit that any facts pertinent to the discussion are not ascertainable. Bargaining implies difference of opinion and compromise until a basis of agreement is reached. You do not bargain about or vote on scientific facts. If the ideals of positive management are realized, therefore, the field left open for collective bargaining is narrowed to those matters which cannot be, or at least have not been, reduced to law.

In the opinion of some this eliminates altogether the possibility of collective bargaining; for they believe there is no factor, not even the basic wage rate, which cannot be reduced to accurate scientific determination, even if such determination is only the resultant of an unanalyzed "law of supply and demand." Others (of whom I am one) believe that while the basic wage rate is doubtless determined by some law, natural or social, the law has not yet been accurately and comprehensively defined; and that therefore, theoretically at least, the basic rate of wages may be a subject of bargaining. But there is complete agreement that such matters as the process to be used, or the time which it should take to perform a given piece of work, and the amount of

bonus which is to be paid for its performance within a standard time, are questions of fact, and therefore not in any sense subject to collective bargaining.

More important, however, than the theoretical consideration is the circumstance that collective bargaining under existing conditions requires a recognition of the union and thereby brings in its train a series of difficulties and conflicts which might be avoided altogether by consistent refusal to deal with organized labor. The bargain on basic wage rates, even tho theoretically consistent with positive management, does in fact involve many details of organization such as the length of the working day, the employment of men or women or children, and the determination of what constitutes the (customarily ordinary) day's work. Further, such a bargain opens the way to "dickering" over many other details such as the degree of specialization to be required, the functions and authority of minor executives, the principles governing inspection and the reduction of defective workmanship. All scientific managers will testify that at best the difficulties of their work are extreme, not to say heartbreaking. To complicate them with the necessity of conferring with committees of workmen not in the slightest degree familiar with the principles of management or the details as they are being worked out in the plant under process of systematizing, would be wellnigh fatal.

To this difficulty must be added the well grounded fear of abuse of the striking power of organized labor. Whatever may be said in favor of the strike as a weapon to secure, under the current types of management, the reasonable demands of the workmen for shorter hours, higher pay, or better conditions, it is difficult, if not impossible, to justify the sympathetic strike and its even worse variety, the strike that grows out of jurisdictional

disputes. The manager who by reason of his standardization of conditions, payment of higher wages, fair treatment of his employees, and development of a type of organization which renders jurisdictional disputes almost meaningless has removed practically all the tenable grounds for striking, is justified in his fear of mere sympathetic and jurisdictional strikes.

The manager's aversion to recognizing a union is still further intensified by his distrust of the type of leadership which is characteristic of much of American labor organization today. Even its friends must admit that the American Federation of Labor is governed and controlled by a type of leadership marked rather more by political ability (in the objectionable sense) than by a broad-minded, socially trained public spirit. Exceptions must doubtless be made to this general judgment of current labor leadership; but that it is substantially accurate cannot be denied by anyone who faces the unfortunate reality.

A great many union men are now working in scientific management plants. The organized complaint against this system which has had so much publicity comes from an insignificant fraction of the union men actually working under it, and there is at least reasonable ground to believe that the real feeling of even that fraction is misrepresented in the complaints officially emanating from them. If this is true, it is but a testimony to the fundamental reasonableness and intelligence of the average working man. The practitioners of positive management have every means of knowing and have always insisted on a recognition of this native reasonableness; and if it could always be found in the same degree among the "leaders" who would represent these men on committees for purposes of collective bargaining, the present unwillingness to consider even

the possibility of such bargaining would rapidly disappear. Under existing conditions, however, every day's experience provides additional practical arguments against collective bargaining.

The labor union policies of restriction of membership, limitation of apprentices, and the closed shop, are all, as at present practised, contrary to the principles of positive management, for reasons too obvious to call for discussion. The principle of organization on craft lines, as exemplified in the American Federation of Labor, is also incompatible with the tendency of scientific management to substitute a classification of labor on the basis of efficiency and teachableness for a grouping on the basis of trade or occupation. This tendency is in fact the most irresistible weapon that scientific management now opposes to the current type of labor organization as represented in the American Federation of Labor. To those intelligent enough to distinguish the real principles of syndicalism from its crudities it will be apparent that the I. W. W. represents more modern tendencies and, unless it is killed by its abuses, has a more promising future (partly because of its greater consonance with the principles of positive management) than the American Federation.

In the light of this discussion it would appear that scientific management in its present form and organized labor as represented in the American Federation in its present form cannot persist together. One or the other must be modified. If history may be relied on to repeat itself, it is safe to prophesy that positive management, on account of its superior economic advantages, will compel the revision of labor organization, while itself not entirely escaping the necessity of some modification.

It is conceivable that labor organization may shift its basis from restriction of output, uniformity of wage and

restriction of membership to an acceptance of the principles of maximum output, wages in proportion to ability, and freedom of membership, while still retaining its fundamental and necessary power to help determine the minimum wage rate and the minimum working conditions through the instrumentality of some mechanism in the nature of a collective bargain. If bargaining is, as I believe, the determining factor in the establishment of the basic wage within certain limits, there will always be a need for organization of employees to enable them to offset by their combined strength the strategic advantage of the employer due to his initiative in hiring and his control of the purse strings. The features of current trade unionism objectionable from the point of view of positive management and, as I believe, from the social point of view, are unnecessary to the existence of labor organization in the interest of the maintenance of minimum rates and conditions. Furthermore the labor politician in his present stage of evolution is not only unnecessary, but is an active detriment to the fulfillment of the best purposes of labor organization. For the development of collective bargaining on a basis of fact instead of compromise of opinion, labor organization must secure and maintain a radically different type of leadership from that which it now has. To this end all it has to do is to scrutinize its present leadership carefully, appreciate how misrepresentative and misleading some of it actually is, and substitute for that element a genuinely representative leadership that is law abiding, fair in intention, socially minded, honest, intelligent and interested in the permanent welfare of its constituents.

On the other hand, as positive management extends from the plants which are entirely non-union shops, or are at least open shops, to those in which unions are

strongly organized or even dominant, it will be incumbent upon it to recognize the necessity of some kind of coöperation. Even if this universe is as deterministic as some exponents of positive management insist,¹ the laws governing social and economic relations and the interaction of individuals on each other are not yet formulated; and until they are, there must remain a place for bargaining. Positive management must recognize also its two-fold character as a collection of laws on the one hand and as a set of principles on the other. The laws of science are not determined by counting heads; but principles of conduct in a free society can be enforced only by the consent of those affected. If this consent requires the coöperation of organized labor, so be it, provided this coöperation does not involve the sacrifice of fundamental industrial and social principles.

Scientific management, in spite of some of the claims of its more enthusiastic advocates, is not an industrial panacea. It cannot put an end to industrial unrest so long as personal and economic friction and inequality of income and opportunity persist. It is well that this is so, for complete content would be stagnation. On the other hand positive management does narrow the field of unrest and tends to refine the methods by which discontent makes itself audible and effective. It clarifies the issues between labor and capital, makes them more definite and more closely circumscribed. This process reduces the number of possible disputes and at the same time increases the possibility of arbitrating those that are left. In the long run this means less warfare and bitterness and more substantial justice to both sides.

¹ See preface to the French translation of Taylor's *Shop Management* by Henri Le Chatelier; reprinted in Thompson's *Scientific Management*, p. 842

Some time ago I suggested that the labor unions in their own interest should advocate and compel the adoption of positive management in those plants in which they could make their influence most felt.¹ I have since come to the conclusion that this is utopian. Before it can be done there must be a new type of leadership, and those policies of organized labor which are incompatible with the fundamental principles and practices of positive management must be abandoned. Further, the necessary unanimity of action on the part of all trades in a plant can be secured only by the "industrial" type of organization — represented perhaps by the I. W. W. — not by that exemplified in the American Federation of Labor.

I still believe, however, that the tendency is in this direction and that it can only be postponed and not diverted by the active opposition of labor leaders and by public interference such as was attempted in recent congressional legislation. In the long run the effect of such interference is helpful to positive management because of the publicity given it and the evident importance attached to it even by those professionally opposed. In industry, as in religion and politics, there is nothing like persecution to aid a cause which is inherently good.

V

LARGER SOCIAL PROBLEMS

What progress has positive management made or is it likely to make toward the solution of larger problems, such as the reduction of unemployment, the improvement of education and skill, the smoothing out of in-

¹ See C. B. Thompson, "The Relation of Scientific Management to the Wage Problem," *Journal of Political Economy*, vol. **xxi**, p. 630. Reprinted in Thompson, *Scientific Management*, p. 796. Cf. Croly, *Progressive Democracy*, pp. 399 ff.

equalities of income, and the development of democracy in industry ? Its originators and advocates claim the solution of these among its fundamental aims. It is altogether too early to give a just appraisal of its actual effect on such matters; but it may be advisable to consider just what positive management does contribute toward the complex of factors bearing on them.

On the problem of unemployment positive management has already contributed valuable experience and has pointed out the way in which a partial solution may be found. One of the greatest causes of unemployment, aside from the maladjustments due to crises and panics over which positive management can have no control, is the seasonal fluctuation in demand found in so many industries. From the point of view of positive management these seasonal fluctuations mean exceptionally high cost of production during periods of activity, due to the sudden access of workers who have to be trained quickly and to the multitude of rush orders that interfere with the steadiness of administration under which any system works most effectively. Positive management has therefore insisted on equalizing the demand. This is done by offering special inducements to customers to place orders that can be executed during the otherwise dull periods. The cost accounting methods which propose to equalize the cost of production by charging the loss due to unused plant and equipment directly to profit and loss rather than to the cost of production, do not relieve the management of the necessity of taking up this loss by more effective marketing. The results of the policy insisted on by positive management are steadier employment for all workers and less fluctuation in the earnings of piece workers. This is promoted by the policy of training employees in different kinds of work, so that when the demand slackens in one depart-

ment they may be easily transferred to other departments in which the demand is greater.

There should also be noted the effect of the higher wages that accompany positive management. In the first place it tends to reduce the restless wanderings of employees from plant to plant, which is one fruitful tho comparatively unexplored cause of unemployment. In the second place steadier employment, by increasing the value of the employee to his plant, tends itself to raise his wages still further. This improvement when properly utilized by the management reacts again on the cost of production, ultimately in some cases on the selling price and the demand for the product, and finally back again on the demand for workers.

As yet positive management has not in fact seriously affected the problem of unemployment. It is safe to say that it has in no case reduced the number of men actually employed, while on the other hand it has in several instances increased that number. Either result, however, has affected such a small number of plants as to have been but an insignificant factor, compared with those larger and vaster economic forces whose effect is registered in the number of the unemployed.

Closely connected with the problem of the unemployed is that of the education and skill of the employee. In periods of decline in business the men first laid off are those who are the most costly, and as a rule these are the relatively uneducated and unskilled. What effect has positive management on this problem ?

Efforts to revive apprenticeship, either in the old form under master-workmen or in the new form of apprentice schools, may by this time be set down as failures. Today there is practically no such thing as a master-workman who is acquainted with all the tradition of his handicraft. Practically all workmen are specialized and the

utmost they can teach is the little specialty they have learned, a specialty which in many instances can be taught in a few days or even in a few hours. The apprentice schools attempt to give a smattering of all-round acquaintance with the job. When they are connected with plants they reduce this as much as possible, plunge at once into specialized training, teach the youth to do a limited job, and keep him doing a man's work for a boy's pay as long as practicable. When they are not connected with industrial establishments they go to the other extreme and teach a mass of traditional technique and theory, often with the aid of antiquated and obsolete equipment, which is useless and promptly forgotten when the youth is confronted by a real job under commercial conditions.

Positive management changes all this. Power driven machinery had already increased output by the substitution of mechanical power, speed, and endurance, for the corresponding human qualities. Positive management goes further and increases output by the mastery of the natural laws involved and by increasing human skill and control. The effect of positive management therefore is to put a premium on personal capacity and development. This it does by its policy of individualized and intensive training, specialization, and the substitution of definite high standards of accomplishment for the old feeling of all-round but indefinite capability.

This policy of course gives occasion for complaint about the effects of ever greater specialization. Since the industrial revolution began it has been considered proper to mourn the disappearance of the traditional all-round artisan. But is his passing really a misfortune either for himself or society? In the first place it is doubtful if there were very many of him. To be versatile

is not difficult, but to exhibit great capability in versatility is rare. If we may judge from their modern representatives, most of the all-round artisans were more versatile than capable. In the second place, the all-round artisan was content with a standard of accomplishment which is far lower than that expected of and by his modern specialized successor. The workman who today does one comparatively minute operation and does it with superlative excellence is, in his own opinion and that of society, a stronger and more capable man. His standards are raised and with it his self-respect and the esteem in which he is held. It may be pointed out further that the increasing development of specialization makes possible the discovery and training of exceptional capacity along special lines which might otherwise be obscured by the variety of duties imposed. Specialization in foremanship opens a new field of promise to many who were heretofore known as ordinary workmen. The tendency of positive management is to recognize the fact that most men are ordinary, and provide for the most effective coöperative utilization of ordinary capacities. Its chief means for the accomplishment of this purpose is specialization and intensive individual training.

It is hardly necessary to add that this argument does not go so far as to propose the elimination of general and trade education. The social and political justification of such education remains as strong as before. Moreover, the tendency to substitute a knowledge of fact and of law for guess work and tradition demands a degree of general intelligence and education which was quite unnecessary under the old methods of production. Positive management adds a quantitative value to education.

The effect of positive management on inequality of income has been suggested in former parts of this dis-

cussion and will be summarized here. The increase in the supply of managers (at least of the routine type) will, in the first place, reduce the wages of management. At the same time it will increase the demand for capital; and this, together with the greater productivity of the capital employed, will tend to raise the rate of interest. A similar increase in the demand for workmen and in their productivity will raise general wages. The two consequences are compatible because the sum total of the "national dividend" will be larger. At the same time the sharper differentiation of individual abilities and the payment of wages in proportion to efficiency will tend to maintain and even to raise wages still higher.

Certain of these tendencies are permanent, others but temporary. The increase in the supply of managers and the differences in ability of workmen will doubtless remain. The higher rate paid for capital however will tend so to increase the amount of it that becomes available as to result eventually in a return to the previous rate of interest; so that in the long run, if the tendencies of positive management were allowed to work out freely and without interruption, rent and profits, in the narrow sense, would be unaffected, interest would first rise and then fall again, wages of management would tend to become less, and workmen's wages higher. These are obviously steps toward greater equality of income than now prevails.

A question of concern to many is the probable influence of positive management on the tendency toward democracy in industry. What is meant by democracy in industry seems to vary with different thinkers and with the same thinker at different times. We will assume that it means at least a share in the control of industry and free opportunity for advancement.

An industry which is governed by facts rather than by traditions and opinions is fundamentally democratic, at least in the sense that it is immaterial whether the fact is produced by the general manager or the humblest lumper. Arbitrariness on either side is eliminated. Any workman may appeal to the arbitrament of facts with the same certainty of justification as the highest official. In this sense control becomes impersonal; which is a step in advance from the current type of arbitrary personal control.

On the other hand, with the increasing specialization of modern management a greater degree of centralized control is necessary than ever before and this control must ultimately be exercised by one human being over another. To those who consider any degree of restriction of individual liberty, even in the interests of a co-ordinate activity, a derogation of democracy, positive management must be undemocratic; in fact any management must be. So is any type of government. The only alternative is anarchy. If this extreme view is not held, the question becomes whether the control whose necessity is admitted shall be exercised by persons chosen by the controlled or by some other agency. Experience with coöperative productive enterprises has shown the present impracticability of the selection of industrial leaders by the rank and file of the employees. On the other hand, a long history of favoritism, nepotism, indifference and ignorance has shown the inadvisability of arbitrary selection by owners and managers. Positive management provides a method of selection by capacity. In other words, its type of government is that of an aristocracy of demonstrated ability, tempered by the necessity of retaining the good will of the employees without which the methods of positive management cannot be successfully operated, and further

ameliorated by the type of discipline which wells up from beneath and is at least partially self-enforcing.

That such is in fact its result is evident to anyone investigating a plant in which positive management has secured a firm foothold. The executives are but slightly removed from the ranks of the workmen and are in fact as well as in theory the servants of the men. The men occupy a new position of power and responsibility of which they are fully cognizant and have even been observed reminding their "bosses" of any failure in the adequate performance of the bosses' duties.

The characteristic regard for impersonal fact, the greater mobility between ranks and the keener appreciation of individual abilities, characteristic of positive management, provide opportunities for advancement far greater than those commonly observed. There are large differences in the capacity of manual workers. These differences are made evident by time study, are immediately recognized, and the capable workman is an object of exceptional esteem. A long-run effect of this is to transfer esteem from the workman to the work as such and to increase the self-respect of workmen and their regard for their personal rights and corresponding obligations. All these would seem to be in the direction of a sane democracy.

Unless scientific management has before it a long and influential future all the foregoing discussion has a merely academic interest. It has established a firm foothold in the short period of its existence. Whether it will live and grow depends upon whether its inherent advantages can offset some of the difficulties now in the way of its development.

Chief among these obstacles is the conservatism and mental inertia of business managers. Business is proverbially cautious, one might almost say unprogressive.

Managers consider that even in the beaten paths the risks are great enough; and it is only the exceptionally bold or the rash who will step out into the unknown, even tho it may look promising. As success after success is scored by the pioneers, ordinary managers get over their timidity. Today there is evidence of an almost undue haste to adopt the new methods. The demand for scientific management has brought forth a horde of "efficiency experts," untrained, incompetent, sometimes quacks and charlatans, whose operations are tending to discredit the name and purpose of the movement. This phase shows signs of passing and we seem to be settling into a period where the progressive but skeptical manager is coming to the front, who must first be convinced, and when convinced commits himself to the patient development of real science in his plant.

Another obstacle is the cost of the best-known systems, owing to the scarcity of experts capable of developing them and the necessity of finding out, by expensive experiment, the very A, B, C, of the science of each new industry to which the methods are applied. The cost of the first few steps which are now being taken is so high that only plants able and willing to make an investment of \$30,000 or \$40,000, without the expectation of large returns for two years or more, are in position to undertake the development. This obstacle also tends to disappear as experience demonstrates the certainty and largeness of the returns from such investment.

The scarcity of engineers capable of developing positive management also retards its extension. At present it is safe to say that there are not over twenty in the entire country. As all of them give their time personally to the development of their work, this puts a serious limitation on the number of plants that may avail

themselves of their services. The only remedy is the discovery and development of younger men in the same field. There are signs that since the death of Mr. Taylor the liberal policy of the originator of scientific management is being restricted somewhat by his immediate followers. The attention given to the subject in the colleges and business schools of the country, and the increasing demand for specialists in this work, will aid in overcoming the difficulty.

To a certain extent the distrust of social workers and the opposition of organized labor tend to retard the movement; but on the whole it is my impression that the publicity resulting from active opposition, when followed by investigation and publication of facts, as it usually is, tends on the whole to aid it. There can be no question that the recent congressional debates on scientific management in the Watertown Arsenal case, uninformed as on the whole they were, called the serious attention of business men to the actual facts regarding the Taylor system, with the net result of an increasing interest and a desire to secure its advantages.

This enumeration of the obstacles to the development of positive management betrays their smallness and transitoriness in comparison with the greatness and permanence of the forces with which its progress is allied. Already it is demonstrating its capability of great industrial and social advantage to its users. Its close relationship to the movement for the conservation of all resources has been pointed out and its far-reaching consequences as an agency for the conservation of human effort have struck forcibly the popular imagination. Finally its inherent democracy as exhibited in its substitution of fact, so far as possible, for the vagaries of personality, and its provision of self-government and unlimited opportunity for advancement, tie it closely to

the most intelligent political movements of the day. While it would be idle to deny that there are counter-tendencies to all these and that there have been abuses and misinterpretations of the principles of positive management,¹ it seems safe to believe that on the whole it represents an inevitable and irresistible tendency, and that therefore its extension and permanence are assured, so far as, historically speaking, there may be assurance of permanence.

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¹ The discussion of positive management in the recent book of Hoxie, Valentine and Frey, *Scientific Management and Labor*, seems to rest on a consideration chiefly of abuses and inadequacies of the movement.